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TAI CHI FOR MULTIPLE SCLEROSIS

Multiple sclerosis (MS) leads to a progressive accumulation of disability, including balance problems, mobility impairment, fatigue and depression. A growing body of evidence suggests that exercise is beneficial for patients with MS. Despite this fact, most patients with MS remain physically inactive. This study was designed to determine the effects of Tai Chi as an exercise intervention for patients with MS.

This two-armed, prospective trial included 32 patients diagnosed with MS. Eligible subjects were able to walk without an aide, and had an Expanded Disability Status Scale score of less than five. The participants were divided into a mindfulness-based Tai Chi intervention group, performing weekly, 90-minute sessions for six months, or to a comparison group, which underwent treatment as usual. Outcome measures included balance, coordination, fatigue, depression and quality-of-life, with those variables assessed at baseline and at six months.

Thirty-two subjects completed the study. Compared to the control group, the Tai Chi group demonstrated significantly greater improvement in balance ($p=0.031$), coordination ($p=0.003$), depression ($p=0.007$) and life satisfaction ($p=0.012$). No significant difference was noted between the groups in level of fatigue.

Conclusion: This study of patients with multiple sclerosis found Tai Chi to be a safe and feasible exercise intervention, providing physical and psychological benefits.

Burschka, J., et al. Mindfulness-Based Interventions in Multiple Sclerosis: Beneficial Effects of Tai Chi on Balance, Coordination, Fatigue and Depression. **BMC Neurol.** 2014, August; 14: 165.

AMANTADINE, AGGRESSION AND IRRITABILITY AFTER BRAIN INJURY

Irritability and aggression are present in up to 73% of individuals with traumatic brain injury (TBI). While amantadine has been used for decades as an off-label treatment for various brain injury related sequelae, no randomized, placebo-controlled studies have assessed its use in chronic irritability or aggression in TBI. This study was designed to further investigate this issue.

Subjects were between 16 and 65 years of age, each with a TBI of at least six months' duration. All had earned a score of at least two on the Neuropsychiatric Inventory- Irritability Domain (NPI-I). The subjects were randomized to receive either amantadine hydrochloride, 100 mg twice per day, or a matched placebo, for 28 days. Irritability and aggression symptoms were measured with the NPI-I and NPI-aggression (NPI-A). Other tests included the Global Mental Health Scale, the Fatigue Impact Scale, a Brief Symptom Inventory and a Beck Depression Inventory, both at baseline and at 28 days.

For the 72 subjects, the mean changes on the NPI-I were -4.3 in the amantadine group and -2.6 in the placebo group ($p=0.085$). However, when individuals with baseline NPI-A scores of zero to two were excluded, the difference in the mean changes was significant between the amantadine and placebo groups ($p=0.046$). The mean changes in both the frequency and the severity of irritability were also significantly different between those groups ($p=0.0156$ and $p=0.0055$, respectively). No significant differences were found in the changes on the BDI, Global Mental Health Scale, or BSI-A between the two groups.

Conclusion: This study of patients with chronic brain injury

found that amantadine at two hundred milligrams per day can be effective in reducing irritability and aggression.

Hammond, F., et al. Effectiveness of Amantadine Hydrochloride in the Reduction of Chronic Traumatic Brain Injury Irritability and Aggression. **J Head Trauma Rehab.** 2014, Sept/Oct; 29(5): 391-399.

RETURN TO WORK AFTER MILD BRAIN INJURY

Return to work is an important outcome measure for patients with traumatic brain injury (TBI). This study examined factors related to return to work following mild TBI.

Subjects were consecutive patients admitted to a university hospital emergency department with mild TBI. All participants underwent brain CT evaluation in the emergency department, followed by MRI conducted three weeks after the injury. The patients also completed self-report measures and neurocognitive testing approximately three to four weeks post-injury. Those measures included the Barrow Neurologic Institute Fatigue Scale, Rivermead Postconcussion Questionnaire, Beck Depression Inventory-Second Edition, the Hamilton Rating Scale for Depression and the EuroQol Five Dimension Visual Analogue Scale to evaluate health related quality of life. General intelligence was assessed with the Wechsler Adult Intelligence scale-Third Edition. Duration of time off work for illness following injury was also identified.

The cumulative post-injury return to work rates were 46.8% at one week, 59.6% at two weeks, 67% at three weeks, 70.6% at four weeks, 91.7% at two months and 97.2% at 12 months. Logistic regression analysis revealed that age, multiple bodily injuries, intracranial

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abnormality on day of injury CT, and fatigue ratings were significant predictors of return to work at seven, 14, 21 and 30 days post-injury ($p < 0.001$ for all comparisons).

Conclusion: This study of patients with mild traumatic brain injury found predictors of slower return to work included age, multiple bodily injuries, intracranial abnormalities on CT and fatigue.

Waljas, M., et al. Return to Work following Mild Traumatic Brain Injury. *J Head Trauma Rehabil.* 2014, Sept/Oct; 29(5): 443-450.

PERSISTENT COGNITIVE IMPAIRMENT AFTER TRANSIENT ISCHEMIC ATTACK

Transient ischemic attack (TIA), by definition, subsides completely within 24 hours. However, studies using diffusion weighted imaging have found signs of cytotoxic edema beyond the time of symptom resolution in more than 30% of these patients. While TIAs could give rise to transient cognitive deficits, studies examining the persistence of these deficits are scarce. This study was designed to determine the cognitive performance of patients within three months of a TIA.

Patients between 45 and 65 years of age with a history of TIA were studied. All participants underwent magnetic resonance imaging. At three months, each underwent neuropsychological assessment. In addition, all subjects underwent subjective cognitive assessment, using the Cognitive Failures Questionnaire to identify subjective cognitive failures experienced a month before the event. The patients were compared with a control group recruited among spouses, relatives or someone from the patients' social environment.

Between 2004 and 2010, 114 patients with TIA completed neuropsychological testing within three months. Patients with a TIA performed worse than controls on each individual cognitive test and on all cognitive domains except episodic memory. The highest impairment rates occurred in the domains of working memory and attention, while episodic memory was relatively preserved. No significant difference was seen between patients and controls with respect to mean

Cognitive Failures Questionnaire sum scores.

Conclusion: This study of patients with transient ischemic attack found that, at three months after the event, more than a third had an impairment in at least one cognitive domain, with the most common deficits in working memory, attention and information processing speed.

Van Rooij, F et al. Persistent Cognitive Impairment after Transient Ischemic Attack. *Stroke.* 2014, August; 45(8): 2270-2274.

ISOLATED COGNITIVE RELAPSES IN MULTIPLE SCLEROSIS

Among the different presentations of relapse among patients with multiple sclerosis (MS), cognitive relapses lack a clear operational definition applicable to clinical practice. Isolated cognitive relapses (ICRs) occur in the absence of new sensorimotor symptoms. This study further investigated ICRs.

This study included 99 clinically stable patients with relapsing remitting MS, each of whom underwent longitudinal cognitive and behavioral evaluations between 2008 and 2012. All participants were between the ages of 18 and 50 years, with an Expanded Disability Status Score (EDSS) below six, at least 12 years of formal education, with no significant comorbidities or psychoactive drug use. The subjects underwent formal clinical and cognitive evaluations. All patients were evaluated with EDSS, Symbol Digit Performance Testing, Hospital Anxiety and Depression Scale Depression scores, Modified Fatigue Impact Factor Scale total scores and Multiple Sclerosis Neuropsychological Screening Questionnaire self-report scores. Cognitive reserve was also evaluated with the Cognitive Leisure Activity Questionnaire.

Of the 99 patients evaluated, 17 were identified as having ICRs which were not associated with subjective cognitive deficits or depression. Those identified with ICRs at the second evaluation had significantly lower cognitive performance at six and 12 months than those who did not have ICRs.

Conclusion: This study of patients with multiple sclerosis found that isolated cognitive relapses are not associated with subjective changes in mood or fatigue levels nor

with a significant alteration in cognitive abilities insights.

Pardini, M., et al. Isolated Cognitive Relapses in Multiple Sclerosis. *J Neurol Neurosurg Psych*. 2014, September; 85:1035 – 1037.

LOW-CARBOHYDRATE VERSUS LOW-FAT DIETS

Over one third of all American adults have one form of cardiovascular disease, and one third of total deaths are due to cardiovascular disease. This study examined the effects of a 12-month low carbohydrate diet, as compared with a low-fat diet, on body weight and cardiovascular disease risk factors.

This study included 146 adults, 22 to 75 years of age all with a body mass index of 30 to 45 kg/m². The subjects were randomized to receive either a low-fat diet [30% of daily energy from total fat (<7% saturated fat) and 55% from carbohydrate] or a low carbohydrate diet (digestible carbohydrate restricted to 40 g per day). Neither diet included specific calorie or energy goals. Anthropomorphic measures, blood pressure as well as blood and urine samples were taken at all visits.

At 12 months, the decrease in body weight was significantly greater in the carbohydrate group ($p=0.002$). The low carbohydrate diet group had significantly greater reductions in fat mass and increases in lean mass at 12 months than did the low-fat diet group ($p=0.003$). Those in the low carbohydrate diet had a better ratio of total-high-density lipoprotein (HDL) cholesterol ($p=0.002$), triglyceride levels ($p=0.038$) and greater increases in HDL cholesterol level ($p<0.001$) than did those on the low-fat diet. Participants in the low carbohydrate group had significant decreases in the estimated 10-year risk factor for CHD at six and 12 months, while those in the low-fat group did not.

Conclusion: This study, comparing low carbohydrate and low-fat diets, found that the low carbohydrate diet is more effective for weight loss and cardiovascular disease risk factor reductions than the low-fat diet.

Bazzano, L., et al. Effects of Low Carbohydrate and Low-Fat Diets. A

Randomized Trial. *Ann Intern Med*. 2014, Sept 2; 161(5): 309-318.

COMPARING WEIGHT LOSS AMONG NAMED DIET PROGRAMS

Named or branded weight loss programs are available to the general public, and represent a multibillion dollar industry. This meta-analysis reviewed the available literature concerning the relative efficacy of these programs.

This study reviewed six electronic databases for randomized, controlled trials which assigned overweight or obese individuals to a popular brand diet or alternative, with at least a three-month follow-up. The primary outcome variables were weight loss at six and 12 months' follow-up. Secondary outcomes included body mass index (BMI) and adverse events.

Identified were 48, randomized, controlled trials, including 7,286 individuals with a median age of 45.7 years and a median BMI of 33.7 kg/m². Moderate macronutrient and low carbohydrate diets were the most common diet classes. The diet classes of low fat and low carbohydrate had the largest estimated treatment effects. Among those, Weight Watchers, Atkins, and Zone had the most comparisons. Compared with no diet, low carbohydrate diets had a median difference in weight loss of 8.73 kg, similar to that in low fat diets (7.99 kg).

Conclusion: This meta-analysis of popular diets found that low carbohydrate and low-fat dietary programs were associated with more weight loss than other diets. The weight loss differences among individual named diets were small.

Johnston, B., et al. Comparison of Weight Loss among Named Diet Programs in Overweight and Obese Adults. A Meta-Analysis. *JAMA*. 2014, Sept 3; 312(9): 923-933.

METABOLIC SYNDROME AND CAFFEINATED BEVERAGES

The metabolic syndrome is a common affliction characterized by a constellation of metabolic disorders, identified as risk factors for developing cardiovascular disease. Several studies have suggested health benefits of both coffee and tea,

although the mechanisms of these effects remain unclear. This Italian Study was designed to evaluate whether caffeinated beverages are associated with the metabolic syndrome.

Between May of 2009 and December of 2010, 3,254 inhabitants of a southern Italian city were invited to enroll in this study. The participants received a survey regarding basic demographic information, tobacco and alcohol intake and dietary information. The dietary data included questions about caffeinated beverages, with total caffeine intake calculated by the study staff. Weight and height, waist circumference, blood pressure, blood lipids and fasting plasma glucose levels were recorded. The data were reviewed to determine whether the consumption of caffeinated beverages is associated with components of the metabolic syndrome.

Roughly one third of the population consumed daily tea, and one half consumed daily coffee. Coffee and tea consumption were both associated with a significant reduction in the number of components of the metabolic syndrome, and with reduced prevalence of the metabolic syndrome ($p<0.05$ for both comparisons). Other beverages containing caffeine had no such association.

Conclusion: This study found that coffee and tea consumption are associated with a significant reduction in the number of components of, and reduced prevalence of, the metabolic syndrome.

Grosso, G., et al. Factors Associated with Metabolic Syndrome in a Mediterranean Population: The Role of Caffeinated Beverages. *J Epidemiol*. 2014; 24(4): 327-333.

FINGOLIMOD FOR INTRACEREBRAL HEMORRHAGE.

Previous animal studies have demonstrated that, in experimental Intracerebral hemorrhage (ICH), fingolimod (a sphingosine-1-phosphate receptor modulator) can reduce cerebral lymphocyte infiltration and improve functional outcome. This study further assessed the effects of fingolimod for patients with ICH.

Twenty-three patients with supratentorial ICHs of five to 30 ml

were randomized to one of two groups. The treatment group received standard management plus fingolimod at 0.5 mg daily for three consecutive days. The control group received identical treatment without fingolimod. At baseline and on days seven, 14, 30 and 90, the subjects were tested with tools including the Glasgow Coma Scale (GCS), the NIHSS, the modified Rankin scale and the Barthel index. Head CT scans and lymphocyte subset analyses were also completed.

At seven days, a GCS score of 15 was noted in 50% of the control group and 100% of the treatment group. While baseline NIHSS scores were similar between the two groups, the treatment group had significantly lower scores at days seven, 14 and 30. At three months, modified Rankin scores of zero and one, and Barthel index scores of 95 to 100 were found in zero percent of the control group, but in 63% of the treatment group ($p=0.001$). No significant adverse events were noted in the treatment group.

Conclusion: This study of patients with small to moderate basal ganglion intracranial hemorrhages found that fingolimod can reduce edema and neurologic deficits and accelerate recovery.

Fu, Y., et al. Fingolimod for the Treatment of Intracerebral Hemorrhage. A 2-Arm Proof of Concept Study. *JAMA Neurol.* 2014, September; 71(9): 1092-1101.

HEPARIN VERSUS ASPIRIN FOR PREVENTING EARLY NEUROLOGIC DETERIORATION

Early neurologic deterioration (END) and is a common event among patients with acute stroke. This study was designed to determine whether anticoagulation with low molecular weight heparin (LMWH) is superior to treatment with aspirin in preventing END in patients with acute ischemic stroke.

This prospective study included 1,360 patients with first-ever ischemic stroke. The subjects were randomly assigned to receive either enoxaparin twice per day or aspirin at 200 mg once per day for 10 days. Both groups then received aspirin, 100 mg daily for six months. All participants underwent a brain CT scan before randomization and a second scan at 10 days. Baseline data collected,

included demographics, medical history, modified Rankin scale (mRS), and NIHSS scores. At day 10, trained personnel determined the NIHSS and mRS scores. The primary endpoints were the occurrence of END, Early recurrent ischemic stroke (ERIS), venous thromboembolism or myocardial infarction at 10 days post-admission. END was defined as an increase of four or more points on the NIHSS scale.

Of the 1,368 patients, 7.89% suffered from END. There was a significant reduction in the frequency of END among those in the low molecular weight heparin group as compared with the aspirin group ($p<0.001$). At 6 months, there was a significant difference in the frequency of good outcomes among patients over the median age of 70 years ($p<0.001$), as well as in patients with symptomatic stenosis of the posterior circulation ($p<0.01$) and basilar artery ($p<0.01$). Those in the low molecular weight heparin group had a lower frequency of DVT during the first 10 days than did the aspirin group ($p=0.003$). There was no difference between groups in ERIS.

Conclusion: This study of patients with ischemic stroke found that treatment with low molecular weight heparin within 48 hours of stroke until day 10 may reduce early neurologic deterioration

Yi, X., et al. Low Molecular Weight Heparin Is More Effective than Aspirin in Preventing Early Neurologic Deterioration and Improving Six-Month Outcome. *J Stroke Cerebrovasc Diseases.* 2014, July; 23(6): 1537-1544.

BENZODIAZEPINE USE AND RISK OF ALZHEIMER'S DISEASE

Dementia is a public health concern affecting 36 million people worldwide. As benzodiazepines are known to have an acute deleterious effect on memory and cognition, the possibility of an increased risk of dementia with the use of this medication is under debate. This study evaluated the association between past benzodiazepine use and the risk of Alzheimer's disease (AD).

This case control study included individuals 66 years of age or older living Québec, Canada. All were members of the public drug plan from January of 2000 through December

of 2009, which included 98% of the elderly population. From that group, a random sampling of individuals diagnosed or treated for dementia were compared with 86,259 individuals without those conditions. Benzodiazepine use was assessed by dispensation claims and compared to the risk of AD.

During the study, 894 people with AD and 2,873 controls had ever used benzodiazepines. Long-term use was markedly more common among those with AD (32.9%) than among controls (21.8%). The use of benzodiazepines at any time was significantly associated with an increased risk of AD (adjusted odds ratio 1.50). No difference was found between the groups with exposure of up to three months. However the risk was increased to 1.56 with exposure of three to six months and 1.79 with exposure of over six months. No significant interactions were found for anxiety, depression or insomnia.

Conclusion: This case controlled study found that benzodiazepine use is associated with an increased risk of Alzheimer's disease, with this increase accelerating with longer drug exposure.

De Gage, S., et al. Benzodiazepine Use and Risk of Alzheimer's Disease: Case Control Study. *Br Med J.* 2014, September; 349:g5205.

LOW INJURY AND HIGH BENEFIT WITH GRAVITATIONAL WEIGHT LIFTING

Among considerations in weightlifting are the weights lifted and the number of repetitions. Previous studies of the Gravitational Weight Lifting program have demonstrated that middle-aged individuals could lift over 1,000 pounds of free weight in a single lift after 10 weeks of training. This study was designed to determine the benefit to risk ratio among those participating.

Data were obtained concerning 77 consecutive individuals seen at a Gravitational Wellness center over a period of two years. Participants lifted free weights 20 minutes per session, 2-4 times per month. The protocol involved four stations of free weights, including a belt lift, hand lift, chest press and leg press. Participants were contacted by telephone and asked whether they had a physical condition that they had hoped to improve by the weightlifting. Using a

five point Likert scale participants rated the degree that the weight lifting program had improved their presenting complaint as well as how well it had improved their overall subjective health.

The 71 subjects who had agreed to participate had a mean age of 48.6 years. The average weights achieved after a median of 21, 20-minute sessions were 505.69 kg (1110 lbs.) for the belt lift, 181.04 kg (399.1 lbs.) for the hand lift, 138.81 kg (306 lbs.) for the chest press and 390.46 kg (861 lbs.) for the leg press. The modal complaint at presentation was back pain. Patients improved by an average of 4.2 on a five point Likert scale for their presenting complaints, and 4.275 in overall wellbeing. No injuries were reported during the weightlifting.

Conclusion: This study of middle-aged individuals involved in a free weight lifting program found that, after 21 training sessions, the mean weight lifted was over 1,000 pounds. Subjects reported significant improvements in musculoskeletal complaints and overall well-being.

Burke, D., et al. Rate of Injury and Subjective Benefits of Gravitational Wellness Weightlifting. *Open Access J Sports Med.* 2014;5:215-221

LEISURE TIME RUNNING REDUCES ALL CAUSE AND CARDIOVASCULAR MORTALITY RISK

The World Health Organization and the United States government have released evidence-based physical activity guidelines recommending at least 150 minutes of moderate intensity, or 75 minutes of vigorous intensity, aerobic activity per week. This study was designed to determine whether leisure time running is associated with all cause and cardiovascular disease mortality risks, and whether a dose response relationship exists between running and mortality.

Subjects were men and women 18 to 100 years of age at baseline. All participants underwent a physical activity questionnaire, including four questions about running duration, distance, frequency and speed. The subjects were assigned to one of six groups, including non-runners and five groups of runners, divided by weekly running time, distance, frequency, amount and speed. The

participants were followed for mortality from the baseline examination through the date of death, or until study completion.

A sample of 55,137 individuals was available for analysis for all-cause mortality, and 52,941 for analysis of cardiovascular disease mortality. There were 3,413 all-cause deaths and 1217 cardiovascular deaths during the follow-up period, averaging 14.6 years. Compared with non-runners, runners had 30% and 45% lower risks of all-cause and cardiovascular disease mortality, respectively, after adjusting for potential confounders. Runners across all five quintiles of weekly running time, even those with less than 50 minutes per week, had lower risks of all-cause and cardiovascular disease mortality than did non-runners. These mortality benefits were similar between lower and higher doses of weekly running time.

Conclusion: This study found that running, even five to 10 minutes per day at slow speeds, is associated with a markedly reduced risk of death from all causes and cardiovascular disease.

Lee, D., et al. Leisure Time Running Reduces All Cause and Cardiovascular Mortality Risk. *J Amer College of Cardiol.* 2014, August; 64(5): 472-481.

SHOULDER RANGE OF MOTION INFLUENCES ELBOW INJURIES IN PITCHERS

Retrospective studies have indicated that shoulder range of motion deficits are associated with increased elbow injuries in baseball pitchers. This study prospectively reviewed this relationship.

All major and minor league pitchers within a single professional organization were studied over eight competitive seasons. Anthropomorphic data were recorded during spring training. These included shoulder range of motion, as measured with a bubble goniometer. Data were obtained from 505 pitcher seasons, with subjects pain-free and asymptomatic at the time of the testing. Shoulder range of motion deficits in the pitching arm were defined as five degrees less than those of the contralateral arm in flexion, external rotation and total rotation. Internal rotation deficits were defined as a greater than 20°

difference between arms. The pitchers were followed during the subsequent season for elbow injuries.

Overall, 12.8% of the players sustained elbow injuries. Deficits in total rotation in the throwing shoulder correlated with a 2.6-fold increased risk of elbow injury. Deficits of shoulder flexion correlated with a 2.8-fold increase in the risk of elbow injury. No significant increase in elbow injuries was seen among those with deficits in glenohumeral internal rotation or external rotation.

Conclusion: This study of professional baseball pitchers found that those with a deficit in the throwing shoulder total rotation, as well as shoulder flexion, are at an increased risk for elbow injuries.

Wilk, K., et al. Deficits in Glenohumeral Passive Range of Motion Increase Risk of Elbow Injuries in Professional Baseball Pitchers: A Prospective Study. *Am J Sports Med.* 2014, September; 42 (9): 2075 – 2081

TOTAL HIP REPLACEMENT AMONG PATIENTS WITH OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS

Over 50% of patients with rheumatoid arthritis (RA) have reported orthopedic procedures. The outcomes of total hip replacement among patients with RA are not well described. This study assessed pain, function and quality-of-life two years after hip replacement, comparing patients with RA and those with osteoarthritis (OA).

Data were reviewed concerning patients undergoing total hip replacement between 2007 and 2011. From these data, the authors identified patients receiving hip replacements due to RA or OA. Data collected included demographic information, the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), the SF-12v2 Short Form Health Survey, comorbidities and the American Society of Anesthesia Score.

The analysis included 5,473 patients with OA and 193 with RA. Similar proportions of patients with RA and with OA had clinically significant improvements in function, although patients with RA had significantly worse WOMAC function at two years ($p < 0.001$). Patients with RA had worse preoperative WOMAC

pain scores ($p<0.001$) and worse WOMAC pain scores at two years ($p<0.001$) than did patients with OA.

Conclusion: This study of patients undergoing total hip replacement found that those with RA continued to experience worse WOMAC pain and function two years after total hip replacement than did those with OA.

Goodman, S., et al. Patients with Rheumatoid Arthritis Are More Likely to Have Pain and Poor Function after Total Hip Replacements than Patients with Osteoarthritis. *J Rheum.* 2014, September; 41(9): 1774-1780.

SELF-REPORTED PHYSICAL FRAILTY IN THE ELDERLY

The ability to predict disability may provide an opportunity to offer early intervention to reduce or postpone disability in the elderly. This study examined whether self-reported physical frailty can improve the prediction of disability among the elderly.

This longitudinal study assessed self-reported physical frailty and subsequent disability in 355 Dutch individuals, ages 65 or older. A questionnaire was provided, which included queries concerning frailty and disability, with follow-up two and half years later. Physical frailty was identified using components of the Tilburg Frailty Indicator (TFI), including unintentional weight loss, weakness, poor endurance, slowness, low physical activity, poor balance, poor hearing and poor vision. Disability was measured with the Groningen Activity Restriction Scale (GARS). Those 65 years or older who completed questionnaires at both intervals were included in the analysis.

All eight physical frailty components of the TFI were strongly associated with all three disability variables [total, instrumental activities of daily living (IADLs) and activities of daily living (ADLs)], assessed two and a half years later. Bivariate regression analysis indicated that low physical activity predicted both total and ADL disability. Slowness predicted both total and IADL disability. Weakness predicted ADL disability. Weight loss, poor endurance, poor balance, poor hearing and poor vision did not contribute to the prediction of future disability.

Conclusion: This study suggests found that self-reported frailty assessments using the physical subscale of the Tilburg Frailty Indicator can aid in predicting future disability among individuals 65 years of age and older

Gobbens, R., et al. The Prediction of Disability by Self-Reported Physical Frailty Components of the Tilburg Frailty Indicator. *Arch Gerontol Geriatr.* 2014, September-October; 59(2): 280-287.

REHABILITATION ADVANCES FOLLOWING TOTAL KNEE ARTHROPLASTY

While total knee arthroplasty (TKA) surgery often succeeds in improving pain and function, quality-of-life, lower extremity kinematic, and kinetic gait abnormalities often persist. This study evaluated the effects of a biomechanical therapy (Apos Therapy) for patients undergoing TKA.

This prospective study included 17 patients, all initiating treatment at three months post-surgery. The biomechanical therapy was designed to combine center of pressure manipulation in the foot with perturbation during walking. The system consists of two convex shaped biomechanical elements attached to each of the patient's shoes, one located under the hindfoot region and one located under the forefoot region of each foot.

Each patient trained with the device indoors during activities of daily living each day, increasing to 30 minutes per day after four weeks, and 60 minutes per day after six weeks. Outcome measures included walking speed, step length, single limb support (SLS), changes in pain, knee and overall function, and quality-of-life perception.

Walking velocity improved by 46.9%, and SLS on the operated limb by 13.1%. Pain improved by 65.3%, stiffness by 57.6% and function by 64%. The Knee Society Score for overall function improved by an average of 83.7% and the Knee Society Score for knee function improved by 60.6%.

Conclusion: This uncontrolled study of patients undergoing total knee arthroplasty found that biomechanical therapy, beginning at three months post-surgery is associated with improvements in gait

patterns, functional scores and self-evaluation questionnaire results.

Elbaz, A., et al. New Approach for the Rehabilitation of Patients Following Total Knee Arthroplasty. *J Orthopedics.* 2014, June; 11(2): 72-77.

VENOUS THROMBOEMBOLISM IN UPPER EXTREMITY PROCEDURES

The overwhelming majority of research into venous thromboembolism (VTE) rates after orthopedic procedures comes from studies of lower limb surgery. This study was designed to determine the rate of postoperative VTE within all upper limb procedures in a large teaching hospital.

Data were obtained from a complete set of surgical records at a teaching hospital in Worcestershire, United Kingdom. Between 2009 and 2012, 3,357 surgeries were completed. For each of these procedures, records were reviewed for evidence of pulmonary embolism (PE) or deep venous thrombosis (DVT) within 90 days of the surgery.

Of the 3,357 events, a postoperative VTE was identified in six patients, including four with PE and two with DVT, providing a 0.0018% incidence. Five of the six patients had a strong family or personal history of VTE. All PE were diagnosed by CT imaging. Both DVTs were diagnosed by ultrasound imaging.

Conclusion: This retrospective study of patients undergoing upper extremity orthopedic procedures found a 0.0018% incidence of postoperative venous thromboembolism.

Hastie, G., et al. Venous Thromboembolism Incidence in Upper Limb Orthopedic Surgery: Do These Procedures Increase Venous Thromboembolism Risk? *J Shoulder Elbow Surg.* 2014, October; 23(10): 1481-1484.

OBESITY PARADOX IN STROKE

Previous studies have demonstrated that patients with a number of chronic diseases, including stroke, who are overweight or obese, have lower mortality rates than those with normal weight or who are underweight. Noting some

methodological errors in previous studies of stroke patients, the authors of this study evaluated the risk of death among patients with obesity compared to those without.

Data was retrospectively collected for patients admitted to Danish hospitals between 2003 and 2012. Death from stroke was differentiated by whether the death occurred within the first week or the first month of stroke. Covariates collected included age, gender, stroke severity score (measured by the Scandinavian Stroke Scale) on admission, stroke subtype, civil status, cardiovascular risk factors, duration of education and income.

Within the registry, 53,812 patients had data concerning body mass index. The risk of death by stroke among overweight patients was slightly lower than among the normal weight, with this difference evaporating when the analysis was completed by applying multiple imputation for all cases.

Conclusion: This study, comparing body mass index and death by stroke among stroke survivors, was not able to confirm that overweight or obese patients have a reduced risk of death by stroke as compared with normal weight patients.

Dehlendorff, C., et al. Body Mass Index and Death by Stroke. No Obesity Paradox. **JAMA Neurol.** 2014, August; 71(8): 978-984.

BOTULINUM TOXIN AT MOTOR ENDPLATE FOR CERVICAL DYSTONIA

Cervical dystonia, the most common form of primary focal dystonia, is characterized by involuntary contraction of cervical muscles, leading to abnormal movements and postures of the head and neck. Treatment strategies include intramuscular injections with botulinum toxin. This study was designed to determine whether injections to the muscle's motor endplate zone (MEZ) might enhance the effect of the botulinum toxin injections.

Eighteen patients with cervical dystonia were studied. In all patients, botulinum toxin injections were placed in the sternocleidomastoid (SCM) and the splenius capitis (SC) muscle, injected every two to four months. In study one, high density

surface electromyography was used to locate the MEZ. In study two, patients were injected at the MEZ, receiving half of their regular botulinum toxin dose at the endplate zone or their regular doses at the standard injection site. Dystonia severity was recorded before and four weeks after each treatment session, using the Western Spasmodic Torticollis Rating Scale Severity subscore.

In the first study, the MEZ was localized in two thirds of the muscles. In the second study, both the standard approach and the reduced dose at the MEZ resulted in objective improvement of dystonia, with no significant difference between the two groups.

Conclusion: This study found that injecting Botulinum toxin at the motor endplate zone can allow for significantly less botulinum toxin injected, as compared to the standard approach.

Delnooz, C., et al The Clinical Utility of Botulinum Toxin Injections Targeted at the Motor Endplate Zone in Cervical Dystonia. **Euro J Neurol.** 2014;21DOI.1111/ene.12517

EXERCISE RECOMMENDATIONS FOR STROKE SURVIVORS

As of 2010, an estimated seven million adults in the United States were living with sequelae of a stroke. This number is predicted increase to 11 million by 2030. This updated scientific statement was produced as an overall guide for practitioners prescribing exercise for stroke survivors.

Members of the American Heart Association's Stroke Council performed a systematic review of clinical studies and public health guidelines, in order to summarize existing evidence concerning exercise recommendations for stroke survivors. The document underwent extensive American Heart Association internal peer review, Stroke Council leadership review and Scientific Statements Oversight Committee Review, before approval by the American Heart Association Science Advisory and Coordinating committee. Recommendations were made for the acute, subacute and chronic phase of stroke recovery.

For the acute phase of recovery, evidence supports early physical activity, with a focus on mobility,

commencing within 24 to 72 hours after stroke onset. In the subacute phase, aerobic exercise is recommended to facilitate improvements in cardiovascular and vascular health, as well as to improve the risk factor profile. In the chronic phase of recovery, aerobic exercise has beneficial effects on cardiorespiratory health. Benefits also accrue from resistance training programs.

The authors note that commonly reported barriers to exercise among stroke survivors include environmental issues, health problems, stroke related impairments, embarrassment and fear of recurrent strokes. Appropriate screening and treatment of fatigue and depression are considered paramount for initiation and long-term compliance. The most common among motivators for exercise were meeting other stroke survivors who could provide psychological and social support.

Conclusion: This study of the recommendations of the American Heart Association and the American Stroke Association for stroke survivors indicates that exercise is valuable, yet underused, and should begin within 24 to 72 hours of stroke onset.

Billinger, S., et al. Physical Activity and Exercise Recommendations for Stroke Survivors. A Statement for Healthcare Professionals from the American Heart Association/American stroke Association. **Stroke.** 2014, August; 45(8): 2532-2553.

TRANSFUSIONS AND CEREBRAL INFARCTS IN SICKLE CELL ANEMIA

Among children with sickle cell anemia, silent cerebral infarctions are the most common neurologic injury. For the prevention of first stroke, the Stroke Prevention Trial in Sickle Cell Anemia (SSA) showed that regular blood transfusion therapy may be effective. This study examined whether blood transfusions can prevent the recurrence of stroke or the enlargement of an infarction.

This multicenter, randomized, clinical trial assigned children with SSA related silent cerebral infarcts to receive standard care or regular blood transfusion therapy. The participants were five to 15 years of age, with a confirmed diagnosis of SSA and at least one infarction-like

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lesion on MRI. The transfusion group received transfusions approximately monthly in order to maintain a target hemoglobin concentration of greater than 9.0 g per deciliter and a target hemoglobin S concentration of 30% or less of total hemoglobin. At baseline and exit, the subjects underwent brain MRIs and neurologic examinations.

Based upon the results of an intention to treat analysis, the treatment group had an infarct recurrence of two per 100 person-years, as compared to 4.8 per 100 person-years in the observation group ($p=0.04$). The absolute risk reduction was 58%. No significant difference was seen between the two groups in intelligence testing results.

Conclusion: This study found that regular blood transfusion therapy can significantly reduce the incidence of recurrent, silent cerebral infarctions in children with sickle cell anemia.

DeBaun, M., et al. Controlled Trial of Transfusions for Silent Cerebral Infarcts in Sickle Cell Anemia. **New Eng J Med.** 2014, August 21; 371(8): 699-710.

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